

Applicant(s): Jong-hyon Ahn
U.S. Serial No.: 09/879,556

REMARKS

Claims 1-4, 8 and 9 are rejected to because of certain informalities. The claims have been amended such that it is believed that the informalities are corrected. Reconsideration of the objections is requested.

Claims 2-4, 8 and 9 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. The claims have been amended such that it is believed that the rejections under 35 U.S.C. §112, second paragraph, are overcome. Accordingly, reconsideration of the rejections is requested.

Claims 1-4, 8 and 9 are rejected under 35 U.S.C. §102(b) as being anticipated by Liaw, et al. (U.S. Patent Number 5,554,565). In view of the amendments to the claims and the following remarks, the rejections are respectfully traversed, and reconsideration of the rejections is requested.

The applicant's invention is directed to a metal interconnect which includes a conductive line formed in a trench. In cross section, the trench and, therefore, the conductive line, has a lower portion and an upper portion. The lower portion has a width wider than the width of the upper portion such that lifting of the metal interconnect layer from the trench is prevented.

The claims have been amended to clarify features of the invention. Specifically, the claims have been amended to set forth the elongate trench formed in the ILD film and the conductive layer forming a conductive line in the trench having an upper portion with the first width and a lower portion having a second width, the second width being wider than the first width. It is believed that these claim amendments clarify the distinctions between the claimed invention and the Liaw, et al. patent.

Liaw, et al. is directed to a process for formation of a tungsten plug contact. The Liaw, et al. patent discloses a contact plug, not a metal interconnect having a conductive line in an elongate trench, as set forth in the amended claims. The Examiner states that the interconnection layer in Liaw, et al. comprises a barrier layer deposited along the bottom and side surfaces of a trench. However, the applicants have studied the Liaw, et al. patent and can find no disclosure of

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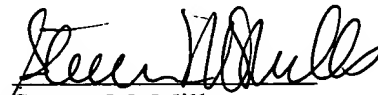
a trench. The barrier metalization 26 of Liaw, et al. is formed within a contact opening to make contact with a source or drain 14 formed in a silicon wafer 10. Hence, the Liaw, et al. is directed to forming a contact plug in a contact hole. It neither teaches or suggests formation of a interconnect layer in which a conductor is formed in a trench. Accordingly, Liaw, et al. fail to teach or suggest the invention set forth in the amended claims. Therefore, it is believed that the amended claims are allowable over Liaw, et al., and reconsideration of the rejections of claims 1-4, 8 and 9 under 35 U.S.C. §102(b) based on Liaw, et al. is respectfully requested.

Attached hereto is a marked-up version of the changes made to the application by the current Amendment. The attached pages are captioned "Version with Markings to Show Changes Made."

In view of the foregoing remarks, it is believed that all claims pending in the application are in condition for allowance, and such allowance is respectfully solicited. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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Version with Markings to Show Changes Made

In the Claims

The claims have been amended as follows:

1. (Amended) A metal interconnect layer for a semiconductor device, comprising:
an elongate trench formed in an interlevel dielectric (ILD) film;
a conductive layer forming a conductive line in the elongate trench, the
conductive line having, in cross-section, a first upper portion having a first width[;] and a second lower portion under the first upper portion, the second lower portion having a second width wider than the first width.

2. (Amended) The metal interconnect layer of claim 1, wherein the metal interconnect layer comprises:
a barrier layer deposited along the bottom and side surfaces of the elongate trench [an interlevel dielectric (ILD) film with a trench having a lower width and an upper width, the lower width being wider than the upper width]; and wherein
[a] the conductive layer is deposited over the barrier layer[,], filling the trench, [the conductive layer having a lower width and an upper width, the lower width being wider than the upper width].